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Docket No. 78-01

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Inventors: Muramatsu et al.

Serial No.: 09/817,947

Filed: March 27, 2001

Title: SUBSTRATE FOR MOUNTING
ELECTRONIC PARTS THEREON
AND METHOD OF
MANUFACTURING SAME

Examiner: Jeremy Norris

Art Unit: 2827

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Date of Deposit: June 13, 2002

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Sharon D'Agostino

#4/A
Amend
J. Mancini
7/19/02

Commissioner for Patents
Washington, DC 20231

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AMENDMENT

Dear Sir:

This amendment is in response to the Office Action dated March 13, 2002 having a
three-month statutory period for response set to expire on June 13, 2002. This amendment
is being filed on or prior to June 13, 2002 Please amend the application as follows:

IN THE CLAIMS

Please amend the claims pursuant to 37 C.F.R. § 1.121 (c) as per direction.

Please cancel Claims 1 and 5. Applicant submits a marked copy of the changes to the
claims attached hereto.

2. (Amended) The substrate for mounting an electronic part or parts thereon

A¹

could
A1

according to claim 6, wherein the hole, in which the lead pin of the electronic part is to be inserted, has an inside wall on which a conductor layer is formed, the conductor layer being led to the land.

A2

6. (Amended) A substrate for mounting an electronic part or parts thereon comprising a core substrate and at least a set of insulation layer and a patterned wiring line layer which is formed on the insulation layer, said set of insulation layer and patterned wiring line layer being positioned at at least one of two opposed sides of the core substrate, the core substrate having holes, in each of which a lead pin of the electronic part is to be inserted, and said core substrate being provided with lands which surround an opening of each of the holes and to which the lead pin inserted in the hole is to be bonded, wherein the insulation layer or insulation layers located at at least one side of the core substrate has bores, which expose the land at a bottom of the bores, and communicate with the holes;

wherein the holes, in which the lead pin of the electronic part is to be inserted, have a closed end at the side of the core substrate opposed to the side on which the electronic parts are to be mounted.

7. (Amended) A substrate for mounting an electronic part or parts thereon comprising a core substrate and at least a set of insulation layer and a patterned wiring line layer which is formed on the insulation layer, said set of insulation layer and patterned wiring line layer being positioned at at least one of two opposed sides of the core substrate, the core substrate having holes, in each of which a lead pin of the electronic part is to be inserted, and said core substrate

being provided with lands which surround an opening of each of the holes and to which the lead pin inserted in the hole is to be bonded, wherein the insulation layer or insulation layers located at at least one side of the core substrate has bores, which expose the land at a bottom of the bores, and communicate with the holes;

wherein at least one of the holes, in which the lead pin of the electronic part is to be inserted, has an open end at the side of the core substrate opposed to the side on which the electronic parts are to be mounted, and at least one of the holes, in which the lead pin of the electronic part is to be inserted, has a closed end at the side of the core substrate opposed to the side on which the electronic parts are to be mounted.

12. (Amended) The substrate for mounting an electronic part or parts thereon according to claim 6, further comprising a hole piercing through the core substrate and having an inside wall on which a conductor layer is provided to connect a wiring line at one side of the core substrate to another wiring line at the opposed side.

13. (Amended) A method of manufacturing a substrate for mounting an electronic part or parts thereon, comprising a core substrate and at least a set of insulation layer and patterned wiring line layer, which is formed on the insulation layer, at at least one sides of the core substrate, the core substrate having holes, in each of which a lead pin of the electronic part to be mounted is to be inserted, and being provided with lands which surround the opening of the hole and to which the lead pin inserted in the hole is to be bonded, and holes having an inside wall on which a conductor layer is formed, the conductor layer extending to a land

provided on each of the sides of the core substrate in order to connect a wiring line at one side of the core substrate to another wiring line at the opposed side, wherein the insulation layer or layers have bores, which expose the land surrounding the opening of the hole in which a lead pin of the electronic part is to be inserted, at a bottom of the bores, and communicate with the hole, and the lands connected to the wiring lines are covered with the insulation layer,

the method comprising the following steps:

providing a core substrate,

forming holes piercing the core substrate,

forming, on the core substrate and around the ends of the holes, lands for the connection with the lead pin of the electronic parts to be mounted, and lands for the connection with the wiring line layers,

filling the holes with a filling material,

forming at least a set of insulation layer and patterned wiring line layer, which is formed on the insulation layer, at at least one side of the core substrate,

forming bores piercing through the resultant insulation layer or layers at the side of the core substrate on which the electronic part or parts are to be mounted, and exposing the land at the bottom of the bores, and

removing the filling material in the holes, in which a lead pin of the electronic part is to be inserted, to allow each of the holes to communicate with each of the bores.

[Please add the following new claims:]

16. (New) The substrate for mounting an electronic part or parts thereon according to claim 7, wherein the hole, in which the lead pin of the electronic part is to be

inserted, has an inside wall on which a conductor layer is formed, the conductor layer being led to the land.

17. (New) The substrate for mounting an electronic part or parts thereon according to claim 16, further comprising lands which surround the opening of the hole at the side of the core substrate opposed to the side on which the electronic parts are to be mounted, and which are led to the conductor layer on the inside wall of the hole.

18. (New) The substrate for mounting an electronic part or parts thereon according to claim 17, wherein the land at the side of the core substrate opposed to the side on which the electronic parts are to be mounted is connected to a wiring line at said side.

19. (New) The substrate for mounting an electronic part or parts thereon according to claim 7, further comprising a hole piercing through the core substrate and having an inside wall on which a conductor layer is provided to connect a wiring line at one side of the core substrate to another wiring line at the opposed side.

20. (New) A substrate for mounting an electronic part or parts thereon, comprising a core substrate and at least a set of insulation layer and patterned wiring line layer, which is formed on the insulation layer, at opposed sides of the core substrate, the core substrate having holes, in each of which a lead pin of the electronic part to be mounted is to be inserted, and being provided with lands which surround an opening of the hole and to which the lead pin inserted in the hole is to be bonded, and holes having an inside wall on which a conductor layer is formed, the conductor layer extending to a land provided on

each of the sides of the core substrate in order to connect a wiring line at one side of the core substrate to another wiring line at the opposed side,

wherein the insulation layer or layers have bores, which expose the land at a bottom of the bore, said land surrounding the opening of the hole in which a lead pin of the electronic part is to be inserted such that said bore communicates with the hole, and the lands connected to the wiring lines are covered with the insulation layer.

REMARKS

Claims 2-4 and 6-19 are pending in this application. Claims 1 and 5 are canceled.

The claims have been amended to more particularly point out and distinctly claim Applicants' invention. No new matter is added. The features in the claims as amended were present in the originally filed specification.

Claims 6 and 7 which the Examiner indicated as containing allowable subject matter have been amended such that the two claims are independent claims and include the subject matter previously found in Claim 1 from which the claims previously depended.

Claims 2 and 12 have been amended and depend from Claim 6. Claim 13 has been amended and is allowable over the cited Gore reference for the reasons stated below.

New Claims 16-19 depend from newly amended Claim 7.

New Claim 20 is directed to a substrate and has features not found in the Gore reference as described below.

Claim Objections

The Examiner objected to Claims 2-4 and 6-15 on the grounds that Claim 1 contained a repeated word. It is respectfully submitted that the objection is moot as Claim 1 has been canceled.

Allowable Subject Matter

The Examiner states on page 3 that Claims 6 and 7 would be allowable if rewritten as an independent claim and included all of the limitations of the base claim. The Office Action states that the allowable subject matter is directed to a closed end at the side of the core substrate opposed to the side on which the electronic parts are to be mounted.

It is respectfully submitted that Claims 2-4 and 6-12 as amended as suggested by the Examiner are allowable. It is submitted that the claims are allowable due to their incorporation of the features set forth above.

The Examiner's Rejection of Claims 13-15 under 35 U.S.C. 102

The Examiner has rejected Claims 13-15 as allegedly being anticipated under 35 U.S.C. 102(b) by Gore, U.S. Patent No. 5,690,270. Applicants hereby traverse the rejection of Claims 13-15. As stated in the Office Action, the Examiner has taken the position that Gore relates to the claimed substrate and method. Gore is directed to a surface mounting and stress relief device and method which uses a low temperature solder 626 and a high temperature solder 616 at opposite ends of a pin 618. In stark contrast, applicants' invention is directed to an insulation layer on a substrate wherein the insulation layer has bores which expose a land at the bottom of the bore surrounding the opening of a hole in which a lead pin of the electronic part is to be inserted. In addition, Claim 20 is also directed to a substrate having the aforementioned claimed feature.

Applicants respectfully submit that Gore fails to teach at least one feature of the patented invention as set forth in Claims 13-15. Gore fails to teach the feature in the present claimed invention of a substrate wherein the insulation layer has bores which expose a land at the bottom of the bore surrounding the opening of a hole in which a lead pin of the electronic part is to be inserted.

Accordingly, it submitted that since the cited reference fails to include at least one claimed feature of the present invention the 35 U.S.C. 102(b) rejection must be withdrawn.

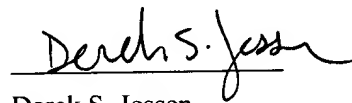
CONCLUSION

For the reasons set forth above, Applicants' present invention, as recited in the amended claims now more clearly and particularly, is patentable. Reconsideration and withdrawal of all outstanding rejections and objections in this case is hereby respectfully requested.

If further matters remain in connection with this case, the Examiner is invited to telephone the Applicant's undersigned representative to resolve them.

Respectfully submitted,

June 13, 2002


Derek S. Jessen
Registration No. 48,213
Paul & Paul
2900 Two Thousand Market Street
Philadelphia, PA 19103
Telephone (215) 568-4900
Fax (215) 567-5057

Order No. 0634

Marked copy of the claims pursuant to 37 C.F.R. Section 1.121(c)

2. (Amended) The substrate for mounting an electronic part or parts thereon according to claim [1] 6, wherein the hole, in which the lead pin of the electronic part is to be inserted, has an inside wall on which a conductor layer is formed, the conductor layer being led to the land.

6. (Amended) A [The] substrate for mounting an electronic part or parts thereon [according to claim 1,] comprising a core substrate and at least a set of insulation layer and a patterned wiring line layer which is formed on the insulation layer, said set of insulation layer and patterned wiring line layer being positioned at at least one of two opposed sides of the core substrate, the core substrate having holes, in each of which a lead pin of the electronic part is to be inserted, and said core substrate being provided with lands which surround an opening of each of the holes and to which the lead pin inserted in the hole is to be bonded, wherein the insulation layer or insulation layers located at at least one side of the core substrate has bores, which expose the land at a bottom of the bores, and communicate with the holes;

wherein the holes, in which the lead pin of the electronic part is to be inserted, have a [has an] closed end at the side of the core substrate opposed to the side on which the electronic parts are to be mounted.

7. (Amended) A [The] substrate for mounting an electronic part or parts thereon [according to claim 1,] comprising a core substrate and at least a set of insulation layer and a patterned wiring line layer which is formed on the insulation layer, said set of insulation layer and patterned wiring line layer being positioned

at at least one of two opposed sides of the core substrate, the core substrate having holes, in each of which a lead pin of the electronic part is to be inserted, and said core substrate being provided with lands which surround an opening of each of the holes and to which the lead pin inserted in the hole is to be bonded, wherein the insulation layer or insulation layers located at at least one side of the core substrate has bores, which expose the land at a bottom of the bores, and communicate with the holes;

wherein at least one of the holes, in which the lead pin of the electronic part is to be inserted, [having] has an open end at the side of the core substrate opposed to the side on which the electronic parts are to be mounted, and at least one of the holes, in which the lead pin of the electronic part is to be inserted, [having an] has a closed end at the side of the core substrate opposed to the side on which the electronic parts are to be mounted.

12. (Amended) The substrate for mounting an electronic part or parts thereon according to claim [1] 6, further comprising a hole piercing through the core substrate and having an inside wall on which [an] a conductor layer is provided to connect a wiring line at one side of the core substrate to another wiring line at the opposed side.

13. (Amended) A method of manufacturing a substrate for mounting an electronic part or parts thereon, comprising a core substrate and at least a set of insulation layer and patterned wiring line layer, which is formed on the insulation layer, at at least one side of the core substrate, the core substrate having holes, in each of which a lead pin of the electronic part to be mounted is to be inserted, and being provided with lands which surround the opening of the hole and to which

the lead pin inserted in the hole is to be bonded, [and the insulation layer or layers at at least one side of the core substrate having bores, which expose the land at their bottoms, and communicate with the hole,] and holes having an inside wall on which a conductor layer is formed, the conductor layer extending to a land provided on each of the sides of the core substrate in order to connect a wiring line at one side of the core substrate to another wiring line at the opposed side, wherein the insulation layer or layers have bores, which expose the land surrounding the opening of the hole in which a lead pin of the electronic part is to be inserted, at a bottom of the bores, and communicate with the hole, and the lands connected to the wiring lines are covered with the insulation layer,

the method comprising the following steps:

providing a core substrate,

forming holes piercing the core substrate,

forming, on the core substrate and around the ends of the holes, lands for the connection with the lead pin of the electronic parts to be mounted, and lands for the connection with the wiring line layers,

filling the holes with a filling material,

forming at least a set of insulation layer and patterned wiring line layer, which is formed on the insulation layer, at at least one side of the core substrate,

forming bores piercing through the resultant insulation layer or layers at the side of the core substrate on which the electronic part or parts are to be mounted, and exposing the land at [their] the bottom of the bores, and

removing the filling material in the holes, in which a lead pin of the electronic part is to be inserted, to allow each of the [them] holes to communicate with each of the bores.